

Claims

What is claimed is:

1. A virtual object for use in a virtual environment, the virtual object comprising at least a visible appearance element, and an internal coordinate system for positioning within said virtual environment with respect to said virtual object.
2. A virtual object as claimed in claim 1, wherein said internal coordinate system comprises unit lengths defined in terms of dimensions of a bounding shape of said virtual object.
3. A virtual object according to claim 1, wherein said internal coordinate system is any one of a group comprising: a polar coordinate system, a Cartesian coordinate system, a cylindrical coordinate system, a tetragonal coordinate system, and hexagonal coordinate system.
4. A virtual object as claimed in claim 2, wherein said bounding shape has a width, a height and a depth, and said internal coordinate system comprises axes having a fixed direction with respect to directions of said width, height and depth.

5. A virtual object as claimed in claim 3, movable to positions, in said virtual environment, expressable in terms of said width, said height and said depth.
6. A virtual object as claimed in claim 5, wherewith said expressions of said locations comprise natural language description for each direction.
7. A virtual object as claimed in claim 6, where said natural language descriptions are selected from a group comprising left, leftwards, port, right, rightwards, starboard, up, upwards, above, down, downwards, below, forwards, near, ventral, fore, backwards, aft, dorsal, North, Northwards, Northerly, South, Southwards, Southerly, East, Eastwards, Easterly, West, Westwards, Westerly, North-Easterly, North-Westerly, South-Easterly, South-Westerly, and synonyms, combinations and translations thereof.
8. A virtual object as claimed in claim 6, arrangeable in terms of said expressions.

9. A virtual object as claimed in claim 4, wherein said position is a preferred position for positioning another virtual object.
10. A virtual object as claimed in claim 4, where said location is a preferred position for repositioning said virtual object.
11. A virtual object as claimed in claim 4, having a designated location associated therewith for selective positioning of another object thereat, so that said virtual object and said other virtual object are logically displayed according to positioning logic associated with said virtual environment.
- 12.. A virtual object as claimed in claim 11, wherein said designated location associated therewith is compatible with an unrestricted range of objects.
13. A virtual object as claimed in claim 11, wherein said designated position associated therewith for selective positioning of a second object thereat is selectively compatible with a subset of objects.

14. A virtual environment for user interaction, comprising at least a first virtual object and a second virtual object and at least a relationship between them, wherein said relationship is selectable to specify an action of said second object.

15. A virtual environment as claimed in claim 14, wherein said relationship between said first virtual object and said second virtual object is any one of a group comprising a positioning relationship, a rotation, a deletion, a translation, a scaling operation, an animation activation, a change of color, a change of texture, a change in a status of the object, selection of the object from an object family, and change of object parameters.

16. A virtual environment comprising at least one virtual object and having a series of potential relationships of said virtual object, said object having a tool tip facility and being selectable to display a tooltip, via said tooltip facility, said tooltip indicating at least some of said potential relationships

17. A virtual object as claimed in claim 16, having a bounding shape, wherein said bounding shape has a width, a height and a depth, and

said internal coordinate system comprises axes having a fixed direction with respect to directions of said width, height and depth.

18. A virtual environment according to claim 16, wherein said indicated relationships are selectable from said tooltip

19. A virtual environment as claimed in claim 16, wherein said tooltip is displayable automatically upon a cursor passing over said virtual object.

20. A virtual environment according to claim 16, wherein potential relationships are associated with parts of said object for display with said tooltip upon selection of said object part.

21. A virtual environment according to claim 16, wherein said relationship is a relationship with another object in said environment.

22. A virtual environment as claimed in claim 16, wherein said relationship is a positioning relationship via a predetermined preferential location associated with said second virtual object.

23. A virtual environment as claimed in claim 22, wherein said
predetermined preferential location has a specific nature, selectively
accepting predetermined types of objects.
24. A virtual environment as claimed in claim 16, which is common to a
plurality of users.
25. A virtual environment as claimed in claim 24, wherein an interaction
by a first user is detectable by at least a second user.
26. A virtual environment as claimed in claim 24, wherein an interaction
by a first user is not detectable by at least a second user.
27. A virtual environment as claimed in claim 16, where said first object
comprises at least a visible appearance element, and an internal
coordinate system.
28. A virtual environment as claimed in claim 16, wherein said
associated coordinate system is selected from a polar coordinate

system, a Cartesian coordinate system, a cylindrical coordinate system, a tetragonal coordinate system, and hexagonal coordinate system.

29. A virtual environment as claimed in claim 16, wherein said virtual object further comprises a bounding shape having a width, a height and a depth, and said associated coordinate system has axes having a fixed direction with respect to directions of said width, height and depth.

30. A virtual environment as claimed in claim 29, wherewith locations in the vicinity of said object, are expressible in terms of said width, said height and said depth.

31. A virtual environment as claimed in claim 30, wherein said expressions of said locations comprise units for each direction with respect to a corresponding dimension of said boundary box.

32. A virtual environment as claimed in claim 30, wherein said expressions of said locations comprise natural language descriptions for each direction.

33. A virtual environment as claimed in claim 32, where said natural language descriptions are selected from a group comprising left, leftwards, port, right, rightwards, starboard, up, upwards, above, down, downwards, below, forwards, near, ventral, fore, backwards, aft, dorsal, North, Northwards, Northerly, South, Southwards, Southerly, East, Eastwards, Easterly, West, Westwards, Westerly, and synonyms, combinations and translations thereof.
34. A virtual environment as claimed in claim 30, wherein said location is a preferred position for positioning other objects thereat.
35. A virtual environment according to claim 32, wherein at least one virtual object is selectable according to a query expressed using said natural language descriptions.
36. A virtual environment according to claim 32, wherein at least one virtual object is arrangeable according to a query expressed using said natural language descriptions.

37. A virtual environment as claimed in claim 16, wherein said first virtual object has a designated location associated therewith for selective positioning of a second object thereat, so that first virtual object and second virtual object are logically displayed according to positioning logic associated with said virtual environment.

38. A virtual environment as claimed in claim 37, wherein said first virtual object has a designated location associated therewith for selective positioning of a second object thereat, where said designated location is compatible with any object.

39. A virtual environment as claimed in claim 38, wherein said designated location associated therewith for selective positioning of a second object thereat is selectively compatible with a subset of objects.

40. A method for moving a first virtual object from a first position to a selected second position associated with a second virtual object, within a virtual environment, each virtual object being approximated by a bounding box and having an internal co-ordinate system, the method comprising:

selecting said first object,

defining a move of said first object into proximity of said second object

using said first object internal co-ordinate system,

operatively associating said first object with said second object, and

positioning said first object with respect to said second object in terms

of said internal co-ordinate system.

41. A method according to claim 40, further comprising automatically adjusting positioning of said first object with respect to said second object so that said first object and said second object are logically displayed.

42. A method according to claim 37, wherein said automatic adjustment comprises associating said first object with a predetermined position on said second object and repositioning said first object to locate onto said predetermined position.

43. A method for constructing a menu of available and permitted user interactions with a first object having at least one user definable relationship within a virtual environment, said method comprising:

constructing a list of a priori user interactions characteristic of said first object,

adapting said list of user interactions by addition of a further list of optional interactions that characterize the at least one user definable relationship to provide said menu.

44. A method for constructing a menu of available and permitted user interactions with a first object having at least one user definable relationship within a virtual environment as claimed in claim 40, said method further comprising displaying said menu to user.

45. A method as claimed in claim 43, wherein said menu is displayable by locating a cursor over said virtual object.

46. Within a virtual environment, a virtual object having an associated menu of available interactions with other objects, said object having dynamically changeable states, said menu being changeable dynamically in accordance with changes of available interactions consequent upon said changes in state.

47. A virtual object as claimed in claim 46, wherein said states are
selected from appearance states, position states, and function states.